

# Cambridge University Engineering Department Overview of Research Computing Facilities\*

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## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Departmental Teaching System Configuration</b>	<b>2</b>
<b>3</b>	<b>Software</b>	<b>2</b>
<b>4</b>	<b>Documentation and Seminars</b>	<b>3</b>
<b>5</b>	<b>User Registration</b>	<b>3</b>
<b>6</b>	<b>Use of the Teaching System for Research</b>	<b>3</b>
6.1	Printing . . . . .	4
6.2	Other Facilities . . . . .	5
<b>7</b>	<b>Security</b>	<b>5</b>
<b>8</b>	<b>Staff Contacts</b>	<b>6</b>
<b>9</b>	<b>Libraries and Literature Searches</b>	<b>6</b>
<b>10</b>	<b>UCS (University Computing Service) Facilities</b>	<b>6</b>

## 1 Introduction

Four main sources of computing facilities are available from the Engineering Department: the departmental teaching system, local special purpose computers associated with particular research groups, the computing service machines and external super-computers. Before you use any of these systems, you will need to register. For the Departmental systems, this is part of the standard registration process for new members of the Department (or can be done at other times - see section 5).

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\*An enhanced version of this is [http://www-h.eng.cam.ac.uk/help/tpl/new\\_user/pgrad/pgrad.html](http://www-h.eng.cam.ac.uk/help/tpl/new_user/pgrad/pgrad.html)

The departmental teaching system consists of a network of machines running linux. This is heavily used for undergraduate teaching so only a limited number of machines are available during the day (see section 6). Outside timetabled hours it provides a rich resource for research work.

Research groups in the department which rely heavily on computers in their work usually have their own computers to suit their particular needs. These facilities are normally restricted to the members of the group concerned but a certain amount of sharing does take place.

The Cambridge-Cranfield High Performance Computing Facility<sup>1</sup> may be useful in some circumstances. It's also possible to access super-computers at remote sites using the Joint Academic Network (JANET).

Peripheral facilities such as printers, plotters and tape drives are provided by the departmental teaching system to a large extent. In some cases (*e.g.* for reading a non-standard tape) it may be necessary to make use of the University Computing Service.

CUED's *Help System*<sup>2</sup> is the main source of help, leading you to both documents and people. The Operators ([operators@eng.cam.ac.uk](mailto:operators@eng.cam.ac.uk)) can give help related to the departmental teaching system. Anyone with questions concerning research computing facilities can contact the help-desk too, but it's worth looking at the *Services for Research Computing*<sup>3</sup> document first.

## 2 Departmental Teaching System Configuration

The teaching system consists of linux terminals (80+ in the DPO on 6 clusters, and 20+ terminals on a cluster in the EIE lab). They offer an easy-to-use interface to Unix and allow routine tasks (file editing, compiling, executing a teaching package, etc.) to be carried out without having to learn Unix commands. The X window system supports multiple screen windows for graphics and terminal emulation, and provides a highly productive environment for experienced users. Along with some Windows machines (10 in the DPO) these can be used to access some more powerful compute servers (`tw100`, `tw200`, etc) and a file server.

3 other linux machines (`club`, `punch` and `plane`) are available for general use. They are not used for teaching so they can be used by postgraduates during timetabled hours with certain restrictions<sup>4</sup>. All undergraduates' files are held on the main fileserver, `file-serv`. Postgraduates are encouraged to use their research group's machines to store their files.

## 3 Software

A wide range of utility software has been installed. Here's a selection.

**Languages** - C, C++, Fortran77, Fortran 90, Java, perl, Python, Tcl/Tk.

**Packages** - ABAQUS, ANSYS, FEMGV, Matlab, Mentor, Pro/ENGINEER, PATRAN.

**Document Preparation** - Emacs, LaTeX, OpenOffice, GIMP, xfig.

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<sup>1</sup><http://www.hpcf.cam.ac.uk/>

<sup>2</sup><http://www-h.eng.cam.ac.uk/>

<sup>3</sup><http://www-h.eng.cam.ac.uk/help/mjg17/research.html>

<sup>4</sup>[http://www-h.eng.cam.ac.uk/help/jmrm/DPO\\_system/access.html](http://www-h.eng.cam.ac.uk/help/jmrm/DPO_system/access.html)

## 4 Documentation and Seminars

### Documents

The primary documentation source is the online help system<sup>5</sup>. This uses the World-Wide-Web to display CUED-produced documentation and also give access to other WWW resources. Only a fraction of the information is duplicated in handouts available from the racks outside the DPO machine room. A few books and manuals are available for consultation or loan from the Operators.

The Introduction to the Teaching System<sup>6</sup> section of the help system includes two principal introductory documents: *Introduction for New Users*<sup>7</sup> and *Unix from the Command Line*<sup>8</sup>. The first document provides a simple introduction to our desktop environment. The second is rather more advanced and covers features useful when working remotely without any graphics facilities.

### Seminars and Courses

Most Fridays during termtime at 3pm there are computing seminars. These cover subjects like the use of L<sup>A</sup>T<sub>E</sub>X, Matlab, Unix, Fortran and C++. For more details see the help system's Seminar<sup>9</sup> page. The University Computing Service offers many seminars too. See their Seminar information<sup>10</sup> and Course information<sup>11</sup> pages for details.

## 5 User Registration

All users of departmental systems are required to complete an online application form. Contact the Computer Operators in the DPO (`operators@eng, x32686`). The use of Engineering Department teaching computing facilities is subject to the rules of the IT Syndicate which are published in the University Ordinances and available online<sup>12</sup> in the help system.

If you are in a research group with its own computer system you must still register with the DPO system. When you do this you should make a note on your application form requesting the operators to send your password and identifier details to the administrator of your group computer system.

## 6 Use of the Teaching System for Research

The teaching system operates continuously throughout the year except for the Christmas period when the Department is closed. A computer operator is in attendance 0845–1730, Monday-Friday (illness and holidays willing), and an additional evening shift is worked to 2045 weekdays during term.

Most of the time, everyone has equal priority but, during term-time, teaching has priority during the periods 0900–1300 and 1415–1615/1800. This applies both to access to individual workstations and

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<sup>5</sup><http://www-h.eng.cam.ac.uk/>

<sup>6</sup>[http://www-h.eng.cam.ac.uk/help/new\\_user.html](http://www-h.eng.cam.ac.uk/help/new_user.html)

<sup>7</sup>[http://www-h.eng.cam.ac.uk/help/tpl/new\\_user/desktop/desktop.html](http://www-h.eng.cam.ac.uk/help/tpl/new_user/desktop/desktop.html)

<sup>8</sup>[http://www-h.eng.cam.ac.uk/help/tpl/new\\_user/command\\_line/command\\_line.html](http://www-h.eng.cam.ac.uk/help/tpl/new_user/command_line/command_line.html)

<sup>9</sup><http://www-h.eng.cam.ac.uk/help/tpl/Seminars/summaries.html>

<sup>10</sup><http://www.cam.ac.uk/CambUniv/Seminars.html>

<sup>11</sup><http://www.cam.ac.uk/CS/Courses/>

<sup>12</sup><http://www-h.eng.cam.ac.uk/help/jmrm/RULES.html>

the use of shared resources, primarily the main fileserver (`file-serv`). Restrictions on research use during these times are discussed below.

The Design and Project Office (DPO) is locked at 2200, Monday–Saturday, when undergraduates are required to leave. Postgraduates and staff may enter the DPO at night and weekends using a swipe card. Some workstations may be accessed remotely - see our Remote Login<sup>13</sup> page.

Workstation clusters reserved for teaching classes are clearly identified by notices at the end of each bench. All other users should vacate these machines in good time before the start of classes to allow incoming students to find a free workstation with minimum delay. This is particularly important during the Part I courses when up to ninety undergraduates are attempting to login at the same time. Workstations in unreserved clusters are sometimes available for non-teaching use. We operate a system based largely on trust and we hope that people will follow these rules as a matter of honesty.

1. No remote logins are allowed during busy teaching periods. These are advertised in advance - look at the online timetable<sup>14</sup> and hours<sup>15</sup> information.
2. During busy periods all non-teaching users should ask the demonstrator whether they can use a machine (rather than the demonstrator having to tell them to log off).
3. The operators will monitor the system at times during a laboratory or when requested by demonstrators.
4. Anyone who ignores these rules will receive two warnings, any further transgressions will result in them being banned from the teaching system for several weeks.
5. The “message of the day” will be changed on the clusters during busy periods to remind people that access is restricted.

## 6.1 Printing

The printers on the teaching system can be used for postgraduate work outside teaching hours, and in a restricted way (for short jobs) during teaching hours. Please contact the operators first if you need to printout during these times. For more about computer based teaching times see the DPO timetable<sup>16</sup>. Please leave a 10 minute gap after the end of the teaching sessions for users to complete jobs and for session overruns.

Access to Laser printer facilities over the network is controlled on an individual basis to allow sharing of costs and to discourage misuse and wastage. Scanning<sup>17</sup> and poster printing<sup>18</sup> facilities are available.

See the Computer Printout Charging<sup>19</sup> page for details of costs.

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<sup>13</sup>[http://www-h.eng.cam.ac.uk/help/tpl/network/college\\_login.html](http://www-h.eng.cam.ac.uk/help/tpl/network/college_login.html)

<sup>14</sup>[http://www-h.eng.cam.ac.uk/help/oper/DPO\\_system/timetable.html](http://www-h.eng.cam.ac.uk/help/oper/DPO_system/timetable.html)

<sup>15</sup>[http://www-h.eng.cam.ac.uk/help/DPO\\_system.html](http://www-h.eng.cam.ac.uk/help/DPO_system.html)

<sup>16</sup>[http://www.eng.cam.ac.uk/app/calcium/calcium?Op=ShowIt&CalendarName=DPO\\_Timetable](http://www.eng.cam.ac.uk/app/calcium/calcium?Op=ShowIt&CalendarName=DPO_Timetable)

<sup>17</sup><http://www-h.eng.cam.ac.uk/help/oper/help/scanner.html>

<sup>18</sup><http://www-h.eng.cam.ac.uk/help/oper/help/printing.html#Posters>

<sup>19</sup><http://www-h.eng.cam.ac.uk/help/oper/help/PrinterCharging.html>

## 6.2 Other Facilities

Several research groups in the department have their own research computers with substantial disk storage dedicated to research. If possible, it is better to use your own group's research facilities for storing large amounts of data and results even if the teaching system is used across the ethernet to perform the actual calculations.

Non-interactive programs can be run overnight and at weekends using the Teaching System's Batch Facility<sup>20</sup> Larger non-interactive programs may be directed to the Cambridge-Cranfield High Performance Computing Facility<sup>21</sup> or national supercomputer centres, although users should still benefit from the local facilities for program development, network access, job submission, and post-processing.

The main departmental fileserver is available for storage of material for which regular backup provision is important. Transient working data sets should in general be kept on local research group facilities. See the backups<sup>22</sup> page for details.

Electronic Mail<sup>23</sup> can be transferred to or from other computer systems. Mail will be delivered to the UCS's hermes<sup>24</sup> system.

Users can access electronic bulletin boards<sup>25</sup>. Some are only available locally. CUED ones include `ucam.eng.announce` (info about system downtime, etc).

For word processing in the Department, Research Students generally use  $\text{\LaTeX}$  or *OpenOffice* on the Teaching System or some other facility associated with their particular research group. The University Computing Service's Public Workstation Facility<sup>26</sup> makes some PCs and Macs available for student use.

## 7 Security

Computers are a prime target for burglars. Please follow the departmental security rules. The department has also suffered from an increasing amount of "hacking". A security breach endangers not only your own account but also those of others. Choose a password that's hard to guess, keep it safe and don't use the same password on all systems. Report any possible intrusions on Engineering Department machines to `eng-cert@eng.cam.ac.uk`.

If you look after a machine, be especially careful - consult our security page<sup>27</sup> and keep updating your Antivirus software<sup>28</sup>. Note in particular the rules about Attachment of Systems to the Department's Network<sup>29</sup>.

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<sup>20</sup>[http://www-h.eng.cam.ac.uk/help/tpl/using\\_batch.html](http://www-h.eng.cam.ac.uk/help/tpl/using_batch.html)

<sup>21</sup><http://www.hpcf.cam.ac.uk/>

<sup>22</sup><http://www-h.eng.cam.ac.uk/help/tpl/backups.html>

<sup>23</sup><http://www-h.eng.cam.ac.uk/help/mail/>

<sup>24</sup><http://www.cam.ac.uk/CS/Services/Hermes.html>

<sup>25</sup><http://www-h.eng.cam.ac.uk/help/network/news.html>

<sup>26</sup><http://www.cam.ac.uk/LocalUsersOnly/CS/Services/PWF.html>

<sup>27</sup><http://www-h.eng.cam.ac.uk/help/security.html>

<sup>28</sup><http://www-h.eng.cam.ac.uk/help/pkc/micros/pc.html#Antivirus>

<sup>29</sup><http://www-h.eng.cam.ac.uk/help/jmrm/network/RULES.html#AttachTo>

## 8 Staff Contacts

For routine questions and requests concerning the departmental system you can send electronic mail to one of the administrative mailboxes listed below.

operators	- general operational problems (operators).
bugs	- bug reports (please give as much detail as you can)
help	- help
sysman	- major system problems.
postmaster	- problems and queries regarding electronic mail.
newsmaster	- newsgroups
network-support	- network problems
webadmin	- problems regarding the World Wide Web.
research-support	- problems with research machines
unix-support	- Unix
pc-support	- PCs
mac-support	- Apple machines

Amongst the other members of the IT Services Division<sup>30</sup> (the people behind the email addresses above!) are: Tim Ablett (Geotechnical), Caroline Blackmun (email), Eleanor Blair (email), Arul Britto (engineering packages), Pete Clarkson (Fortran, PCs), Andrew Flintham (EDC) Patrick Gosling (Fall-side Lab), Michael Gray, Paul Long, John Norcott, John Sloan, Tim Love (programming advisor), James Matheson (head of group), Stephen Mounsey (systems manager), Paul Taylor (WWW planning, databases), Peter Benie (Division A), Roger Wareham (Communications Lab), David Warren (Whittle), Lewis Grantham (Manufacturing), Anna Langley (EARS) and Paul Whitehouse (network and workshops support). Full details can be found online<sup>31</sup>.

## 9 Libraries and Literature Searches

The CUED catalogue<sup>32</sup> is online. The main catalogue of the University Library can be consulted from any computer with access to the University Data Network. This on-line version contains all the index entries from 1978 together with information on serials, and some departmental collections. See the Library page<sup>33</sup> for more information on computerised literature searches.

## 10 UCS (University Computing Service) Facilities

The UCS provide programming advice (e-mail [help-desk@ucs.cam](mailto:help-desk@ucs.cam)), but only for queries about their own facilities - they expect users to consult their local support for more general queries. Courses are provided covering a wide range of topics. As well as the Unix systems, the UCS provides a number of PCs and Macs available for student use (the Public Workstation Facility<sup>34</sup>). For further details consult UCS literature or contact their Help Desk<sup>35</sup>. Application forms to use UCS facilities are available from the operators.

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<sup>30</sup>[http://www-h.eng.cam.ac.uk/help/DPO\\_system/csys\\_grp.html](http://www-h.eng.cam.ac.uk/help/DPO_system/csys_grp.html)

<sup>31</sup>[http://www-h.eng.cam.ac.uk/help/DPO\\_system/staff.html](http://www-h.eng.cam.ac.uk/help/DPO_system/staff.html)

<sup>32</sup><http://www-lib.eng.cam.ac.uk/catalogue>

<sup>33</sup><http://www-lib.eng.cam.ac.uk/resources/eis.html>

<sup>34</sup><http://www.cam.ac.uk/LocalUsersOnly/CS/Services/PWF.html>

<sup>35</sup><http://www-tus.csx.cam.ac.uk/hdesk.html>